REMARKS

Applicants would like to thank Examiner Davis for the analysis contained in the Examination Report dated March 2, 2007.

Informalities in the Drawings

The Examiner objected to the drawings as they contained reference character 250, which was not mentioned in the description. Accordingly, Figure 8 has been amended and no longer includes reference character 250.

The Examiner also objected to the symbols used in the drawings to indicate various materials, which did not follow the symbol conventions in MPEP 608.02. Applicants did not intend to indicate different materials present in the depicted embodiments, and included the various markings merely to allow the reader to distinguish between the various parts. Applicants have amended Figures 1 and 5 – 10 to replace these markings with ones that do not indicate a specific type of material while still distinguishing between the various parts.

Replacement Figures for all of the drawings are provided with better printing quality for clarity. No new matter has been added.

Informalities in the Claims

The Examiner objected to the term "a rotor" in Claim 2, which has been amended to read "the rotor." The Examiner also objected to the reference character 202 in Claim 15 which was not enclosed within parenthesis. Claim 15 was cancelled in the course of responding to the Examiner's substantive objections.

LAW OFFICES OF
CHRISTENSEN O'CONNOR JOHNSON KINDNESS PLLC
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

Claim Rejection Under 35 U.S.C. § 112

The Examiner objected to Claim 12 as being indefinite. Applicants have amended Claim 12 to refer to "an unequal preferential distribution of elastomer coating at intervals along the interior circumference of the tube."

Claim Rejection Under 35 U.S.C. §§ 102 and 103

Applicants have reviewed the Examiner's analysis. Applicants have amended Claim 1 and Claim 10 and ask that the Examiner revisit the patentability of those claims, as amended.

Claim 1

Claim 1 presently stands rejected under 35 U.S.C. § 103(a) as being anticipated by or rendered obvious by Jäger '358.

Applicants have amended Claim 1 to restrict its application to "thick-walled" tubes having a thickness such that the stator structure is able to resist pressure, torque, and axial loads experienced in its intended operating environment. The Examiner will note that Jäger '358 suggests that, without the outer tubular member, the inner tubular member would be prone to deformation during the operation of the Moineau machine (see Col. 2, lines 53 – 65). As Jäger '358 teaches specifically a thin-walled inner tubular member, Jäger '358 does not anticipate Claim 1. Furthermore, because of the advantages listed by Jäger '358 at Col. 2, lines 53 – 65, one skilled in the art would have no reason to attempt to form a thick-walled tubular member.

It is respectfully submitted that a hydroformed thick-wall stator is neither anticipated nor obvious. The teaching of Underwood et al., prior art the Examiner references as Canadian Publication No. 2,333,948 A1, a PCT filing, which appears identical to issued U.S. Patent No. 6,309,195, filed June 5, 1998, states:

LAW OFFICES OF
CHRISTENSEN O'CONNOR JOHNSON KINDNESS PLLC
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

"The preferred embodiment's thick-wall is a significant advance. However, as the thickness of the stator piping increases, manufacturing becomes significantly more complex. Thus new methods of manufacture are also required...." (Col. 4, lines 46-49.) He then goes on to teach that "stator 320 may be manufactured by three manufacturing methods disclosed herein." (Col. 4, lines 59-60.) The three methods are then described, first is rolling, second is cold drawing and third is hot extrusion. Then he teaches that "regardless of which method is chosen to manufacture the lobed tube, the twist in the tube should be precise. Therefore, an additional step that is preferred in each method is to adjust the tube pitch...." (Col. 7, lines 6-9.)

It is apparent from this that Underwood et al., as persons skilled in the art, did not see hydroforming as a viable method for making thick-wall stators. He starts by acknowledging that "new methods of manufacture are required," goes on to identify what appear as a list of all the options he knows about or can conceive. Further, these methods, known to him, still had problems, i.e., difficulty in controlling the final geometry. This is one indication that hydroforming thick-wall stators is non-obvious.

There are only two actual references to hydroform-assisted manufacture of stators or stator components in the identified art:

- Cholet in U.S. Patent No. 6,336,796, filed June 7, 1999, in France, so presumably published about December 7, 2000; and
- Lemay et al., in French Patent No. 2,826,407, filed June 21, 2001, and published December 27, 2002. We note that the applicants' priority date precedes this publication date.

Cholet teaches that the blank is cylindrical (Col. 5, lines 53-55) and describes it as consisting of "sheet metal" (Col. 4, lines 66-67). Cholet also teaches that the method of hydroforming requires the ends of the blank to be either allowed to rotate or forced to rotate

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CHRISTENSEN O'CONNOR JOHNSON KINDNESS PLLC
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

(Col. 6, lines 2-4). This is not a normal step as hydroforming is generally understood. Generally known hydroforming methods anticipate the blank is forced against the mold and relative motion between blank and mold more or less precluded. So Cholet actually discloses a variant that could just as well be described as pressure assisted twist forming.

Lemay teaches a method of externally forming a thin-walled stator, that requires the blank not be cylindrical but pre-formed where "...a first stage of forming by which the said cylindrical metal tube is deformed to provide a preformed blank (12) having internally, approximately the form and dimensions of the desired stator cavity." Here too we have an extra step to enable forming. It should also be noted that the meaning of thick-walled is defined in terms of function and dimension by Underwood et al., who teaches "because the stator is thick-walled, it is not necessary for additional drill piping or other support to be provided adjacent the stator. As used herein 'thick-walled' refers to thicknesses of as least about 3/8". More preferably the walls are on the order of ½"." (Col. 4, lines 30-34.)

Claim 10 presently stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Jäger '358, in view of Seinfeld.

As noted by the Examiner, the Jäger reference discloses a rigid support housing (1) having walls able to resist pressure, torque and axial loads experienced in the intended operating environment and a tube (2), which is deformable supported, within support housing (1).

The Seinfeld reference relating to a "Diaphragm Mechanism" was cited for teaching discrete pressurized axial cavities positioned in the annulus between the deformable tube and the rigid support housing, with means to equalize pressure in the cavities.

Figure 9 of the present application shows a stator assembly 200 (note the rotor is not illustrated) which has a rigid support housing 201 positioned around a thin-walled tube. As with the Jäger reference, there is a space between rigid support housing 201 and the thin-walled tube. That

LAW OFFICES OF
CHRISTENSEN O'CONNOR JOHNSON KINDNESS PLLC
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

space is subdivided into discrete cavities 203 by bulkheads 204. In order to support bulkheads 204, spacer sleeve 205 is provided along rigid support housing 201. Pressure equalization is provided by ports 206 which extend from each of the discrete cavities to the interior of the stator tube in which the rotor will be positioned and along which liquids will pass.

It is respectfully submitted that the Seinfeld reference combined with the Jäger reference would not be equivalent to what the applicants have described and claimed in Claim 10. In the Seinfeld reference, member 16 serves as a stator tube and member 18 serves as a rotor. Upon relative rotation of stator tube 16 and rotor 18, fluid is progressively moved along cavities 38. In FIG. 3, the cavities are labelled as 38a, 38b, and 38c. Movement of fluid through these cavities between conduits 12 and 13 is described in Col. 5, between lines 2 and 11. Diaphragm 17 is positioned between stator tube 16 and rotor 18. Diaphragm 17 is activated by relative rotation of stator tube 16 and rotor 18. The pressure balancing configuration referenced by the Examiner is intended to place lubricant behind diaphragm 17. There is no communication between cavities 38 and the interior of diaphragm 17.

It is respectfully submitted that the teachings of Seinfeld are not the same as the teachings of the present invention for the following reasons:

1. The teachings of Seinfeld relate to a diaphragm. The present application does not use a diaphragm.

2. The teachings of Seinfeld require a source of pressurizing fluid, the pressurized fluid being a lubricant to reduce friction between diaphragm 17 and diaphragm deforming member 18a (Col. 5, lines 28-34). The present application uses direct communication of well fluids through ports 206 into discrete cavities 203.

3. The teachings of Seinfeld position the deformable diaphragm between the stator and the rotor, so that during relative rotation of the rotor within the stator, the diaphragm is caused to

translate and flex within the stator. The present application has discrete cavities positioned between the stator and a rigid support housing, there being no substantive relative movement between the stator tube and the rigid support housing.

It is respectfully submitted that the combination of Jäger with Seinfeld would simply result in the positioning of a diaphragm between rotor 5 of Jäger and stator 2 of Jäger. One skilled in the art would not arrive at the present invention from the proposed combination.

CONCLUSION

In view of the foregoing amendments, it is respectfully submitted that the present application is now in a condition for allowance. Applicants, therefore, request the early issue of a Notice of Allowance.

Respectfully submitted,

CHRISTENSEN O'CONNOR
JOHNSON KINDNESS[PLLC]

Kevan L. Morgan
Registration No. 42,015
Direct Dial No. 206.695.1712

KLM:jlb/nfs

LAW OFFICES OF
CHRISTENSEN O'CONNOR JOHNSON KINDNESS[PLLC]
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100